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Guidance on the phasing out of PFOS based foams for Class B fires

Issued by:

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Addressed to:

The Chair of the Fire and Rescue Authority
The Chief Executive of the County Council
The Clerk to the Fire and Rescue Authority
The Clerk to the Combined Fire and Rescue Authority
The Commissioner of the London Fire and Emergency Planning Authority
The Chief Fire Officer

Please forward to:

Operational personnel, particularly HMEP Officers and those responsible for selection and purchase of firefighting foams

Select contents heading...

This circular, which has been produced jointly by DCLG and the Environment Agency, provides information and guidance on the phasing out of perfluorooctane sulphonate (PFOS) based foams and seeks local authority fire and rescue services' cooperation in the removal of all their remaining stocks of PFOS based foams. The circular highlights the voluntary ban on the use of existing stocks of PFOS based foam being sought by the National Strategic Environmental Group and provides guidance on disposal and possible alternatives for remaining stocks.

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1.0 Background

- 1.1 Perfluorochemicals are a family of chemicals that are generally used in products designed to repel dirt, grease and water. These include kitchenware, carpet treatments, food wrappers, paints, cleaning products and sprays for leather and other clothing. A group of these based on the perfluorooctane sulphonate (PFOS) structure have been shown to be hazardous.
- 1.2 PFOS has been used in a diverse range of applications, from firefighting foam (in which it enables film formation) to use as a mist suppressant in chromium plating. PFOS was also used in common household products, such as “Scotchgard”.
- 1.3 Recently, perfluorooctane sulphonates have been found to be highly persistent, bioaccumulative and toxic. Data from those working in industries manufacturing perfluorochemicals have indicated that exposure to PFOS can result in adverse impacts on liver function.
- 1.4 The perfluorooctane sulphonate structure is very stable and is not thought to undergo any further degradation in the natural environment. Due to this extreme stability it has now become widespread at very low levels both in man and the environment. The biological persistence of perfluorooctane sulphonates in living organisms is high, with an estimated elimination half-life for humans of the order of four to eight years.
- 1.5 These concerns resulted in the principal manufacturer of PFOS (3M) announcing a voluntary phase out of PFOS manufacture in May 2000, with production by 3M falling from over one thousand tonnes per year to none in 2003. However, PFOS continues to be produced by other companies and is still used in some industrial processes, for example semiconductor production and chromium plating.

2.0 Firefighting foams for Class B fires

- 2.1 PFOS was an ingredient in two AFFF foam concentrate ranges made by 3M (Lightwater™ and ATC™).
- 2.2 These concentrates have a shelf life of at least 10 years and may therefore continue to be in date for several more years. In October 2004, due to environmental concerns, DEFRA consulted on a national action to restrict the use of PFOS. This included proposals to phase out, within 5 years, its use in firefighting foams.

- 2.3 In December 2005, the European Commission issued a proposal for a Directive restricting the marketing and use of PFOS. In this initial draft Directive, all current PFOS uses (including firefighting foams) would be allowed to continue. The EU has also prohibited the UK imposing unilateral restrictions on the use of PFOS and any action to restrict the use of PFOS will now proceed at an EU level.
- 3.0 Environment Agency Policy on disposal of PFOS based foams**
- 3.1 The Environment Agency has conducted a national environmental risk assessment for PFOS. This concluded that there was an environmental risk for all PFOS uses, including firefighting foams.
- 3.2 Given the risk the Environment Agency will use its available powers to prevent, and where this is not possible, minimise the emissions of PFOS to the environment.
- 3.3 To support this approach the Environment Agency has developed a policy on the disposal of effluents (which includes firewater) containing PFOS. This is currently being updated and will shortly be available on request.
- 3.4 This recognises that PFOS is a List 1 substance under the Groundwater Regulations 1998 and its introduction into groundwater (the water table) is prohibited. The same statement is also true for any other fluorosurfactant in alternative (non-3M) products. The Environment Agency will also seek to prevent all unauthorised discharges of PFOS to surface waters, as this is likely to constitute an offence under the Water Resources Act 1991. There is a defence available if the discharge is made in an emergency to protect people providing the Environment Agency is notified and all such steps as are reasonably practicable in the circumstances are taken to minimise the impact.
- 3.5 The Environment Agency would therefore in practice like to see firewater, containing foam contained wherever practicable.
- 4.0 Impact on the Fire and Rescue Service**
- 4.1 All Class B foams are polluting. A number of fluorine based PFOS alternatives have been developed for use in fire fighting foam (the “telomers”). There is currently no conclusive evidence available to show if these PFOS substitutes, and in particular their breakdown products, cause a risk to human health or the environment. This is the subject of current research.
- 4.1 The Environment Agency fully recognises the value of foams in dealing with Class B fires and accepts that there may still be a need for those containing PFOS to also be used when dealing with incidents where there are no suitable alternatives available.

- 4.2 The fire at Buncefield has highlighted issues about which fire and rescue services should be particularly aware. Notably some fire and rescue services are holding stocks of the two 3M PFOS based foam concentrates because budgetary constraints have dictated they should use these before replacement. However, these fire and rescue services should be aware that, if these foams are used, every effort should be made to prevent firewater entering ground or surface waters. In addition the disposal of the resultant firewater could be costly.
- 4.3 Given these issues the National Strategic Environmental Group¹ that coordinates the partnership between the 3 UK environmental agencies and the UK fire and rescue service has agreed that it should seek a voluntary ban on the future use of PFOS based foams by the UK fire and rescue service. The group therefore requests that those fire and rescue services which still hold stocks of 3M foams do not use these in future and replace them with non-PFOS based foams. This solution removes the problem whilst it is still a manageable size i.e. concentrate rather than foam solution. A number of fire and rescue services have already taken this decision unilaterally.
- 4.4 The Environment Agency's preferred option for disposal of the foam concentrate is high temperature incineration at 1100+°C.
- 4.5 Various foam formulators are developing fluorosurfactant free products which do not have the long-term environmental concerns associated with fluorosurfactants. Fire and rescue services should consider the use of these products where they can satisfy themselves that the fire performance meets the local needs.
- 4.6 A further development is the emergence of Compressed Air Foam Systems (CAFS). These typically use much lower percentages of film forming foam in water e.g. 0.5-1% for Class B applications. The smaller quantities of foam concentrate used should reduce the risk of pollution and also considerably improve the efficiency of water use. However, as with the use of any foam, this does not mean that CAFS can be considered as completely environmentally friendly.

¹ The National Strategic Environmental Group comprises members from the Environment Agency, the Local Government Association, the Fire Service College, the Scottish Environmental Protection Agency, Her Majesty's Fire Service Inspectorate, the Chief Fire Officers Association, Northern Ireland Fire Brigade, Environment & Heritage Service Northern Ireland, Scottish Fire & Rescue Service and Her Majesty's Fire Service Inspectorate Scotland.

- 4.7 The recently revised Protocol between the Environment Agency and the Local Government Association, which will be signed shortly, highlights the potential problem from foam and specifies that incident commanders should think carefully about the environmental impacts before using it. The Protocol also refers to the guideline incident reporting criteria between the Environment Agency and the fire and rescue service within the proposed Fire Service Manual. These advise the fire and rescue service to contact the Environment Agency whenever foam is used at an incident, excluding domestic fires.
- 4.8 Pollution from the use of any foam for training purposes is unacceptable and foam training should not take place in areas that discharge to surface or groundwaters. Furthermore PFOS containing foam must never be used for training purposes as even if foam is directed to the foul water, the sewage treatment process will not destroy the PFOS and it will consequently be discharged into the aquatic environment at outfall.
- 4.9 Class B foams must not be used for Class A applications except in highly extenuating circumstances.
- 4.10 Class A foams do not contain PFOS or other fluorosurfactants and are not therefore covered by this circular.
- 5.0 **Future Guidance on the Environmental Effects of Foams**
- 5.1 More comprehensive guidance on the environmental effects of firefighting foams will be provided in a fire and rescue service Manual - 'Environmental Protection' which will be published later in the year.
- 5.2 This circular provides advice and guidance based on the current status of foams and further guidance will be provided as and when new information becomes available.

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Fire and Resilience Directorate